

REMARKS

The amendments set out above and the following remarks are believed responsive to the points raised by the Office Action dated February 12, 2004. In view of the amendments set out above and the following remarks, reconsideration is respectfully requested.

Claims 3-6 and 8-13 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims have been amended to improve the form of the claims and more distinctly claim the subject matter which Applicant regards as the invention. No new matter has been added; the amendments are supported by the original specification, claims, and drawings. Thus, it is respectfully submitted that with these amendments to the claims, the bases for rejection under 35 U.S.C. §112 has now been overcome and should be withdrawn.

Claim 3 did include an equation defining K. It is well accepted mathematical notation to use : to mean a ratio, which is equivalent to division. A slash indicating division has been substituted for the : in claim 3 to provide more familiar mathematical notation. The rejection of claim 5 with regard to the word "correlates" is overcome by the addition of claim 6 to claim 5. The questioned limitations of claims 5 and 8 have been clarified, overcoming the rejections. Claim 8 has also been clarified as to the part with the maximum radius. The alternative limitations of claims 9-11 are eliminated, in part by adding claims 14 and 15 and using accepted Markush language. Further claim amendments are made to eliminate unnecessary symbols and to ensure that each term has proper antecedent basis.

Claims 1, 2, and 10 were rejected under 35 U.S.C. §102 as anticipated by U.S. Patent No. 5,984,681 to Huang. Claims 1, 3, 4, and 10 were rejected under 35 U.S.C. §102 as anticipated by DE 4041378 to Moisiadis. Claims 2, 5, 11, and 12 were rejected under 35 U.S.C. §103 as unpatentable over Moisiadis. Claims 6-9 and 13 were rejected under 35 U.S.C. §103 as unpatentable over Moisiadis in view of U.S. Patent No. 5,642,996 to Mochida et al. Claims 9 and 13 were rejected under 35 U.S.C. §103 as unpatentable over Huang in view of Mochida et al. These rejections are respectfully traversed.

Independent claim 1, the only independent claim, is directed to a dental implant including, *inter alia*, a root part which extends to a bottommost implant tip and has a parabolic contour along the entire length of the root part, with the implant tip as the vertex.

According to the Office Action, Huang in Figure 7 and Moisiadis in Figure 1 each disclose a dental implant having a parabolic outer contour. Applicant respectfully disagrees.

Figure 7 of Huang merely shows an implant having curved outer contour, but nowhere does Huang teach that the outer contour is parabolic, let alone that the outer contour is parabolic over the entire length of the root part. Huang discloses that the lower portion of the dental implant assumes “a generally tapered and conical shape”, but is completely silent as to the specific type of tapered and conical shape. A “generally tapered and conical shape” can comprise contours other than parabolic, e.g., hyperbolic, and thus Huang’s disclosure of “generally tapered and conical” does not teach a parabolic outer contour. Furthermore, Huang identified a specific type of contour very precisely for another region of the implant, i.e., with respect to the contour of the offset top portion of the implant, Huang specified that the top portion assumed a generally elliptical configuration (col. 6, line 13). Clearly, when a specific contour was desired, as in the offset top portion of the implant, Huang precisely defined it; however, no specific contour was even mentioned for the root part.

Similarly, Moisiadis fails to disclose a dental implant including a root part having a parabolic contour along its entire length. Indeed, as seen in the Figure, the dental implant of Moisiadis is cylindrical over a substantial part of the root part. A root part having the cylindrical configuration of Moisiadis fails to provide the benefits of the claimed root part having a parabolic contour over its entire length. For example, due to the cylindrical part of the root part of the implant of Moisiadis there is no optimal transfer of forces into the bone over at least half the length of the implant.

The presently claimed implant including a parabolic contour along the entire length of the root part offers significant advantages over the prior art. For example, the presently claimed implant provides superior primary stability of the implant, in part due to a biological interlocking mechanism, brought about by the claimed parabolic contour. The biological interlocking mechanism comprises an ion binding mechanism between the implant and some proteins (e.g., collagen, fibrinectin) contained in the bone. The superior primary stability achieved by the inventive implant and the claimed parabolic contour allows the prosthesis to be completed in the same session in which the implant is set in the bone, and also allows chewing forces to be applied to the prosthesis immediately after setting the implant or the prosthesis. Thus, the parabolic outer contour of the root part which extends over its entire length, provides many advantages and makes the presently claimed invention superior to prior art implants.

Prior art implants, including those of the type disclosed in Huang and Moisiadis, rely entirely on mechanical interlocking between the implant and the bone to anchor the implant in the bone. Such mechanical interlocking provides inadequate primary stability immediately after setting, for example, as evidenced by the required healing time (e.g., of at least one month and more preferably three months (Moisiadis, col. 2, lines 5-10) and of approximately 3 to 12

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months (Huang, col. 8, lines 46-48)) before the prosthesis can be completed and chewing forces can be applied. This healing time, required by both Huang and Moisiadis, is necessary so that the bone has time to grow in direct opposition to and/or into the surface of the implant, in order to provide good secondary stability of the implant (stability of the implant after the healing period). Only after achieving such secondary stability can chewing forces acting on these prior art implants be properly transferred to the bone. Requiring such an extended healing period and then additional treatment after healing, and only obtaining secondary stability are significant disadvantages for the patient and can cause considerable inconvenience as well as discomfort.

In summary, there is nothing in the cited references that would lead one of skill in the art to the presently claimed invention.

In view of the amendment and remarks recited herein, the application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue.

If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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